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ABSTRACT

This paper proposes a rationale and a plan for using on-line data base retrieval services to provide bibliographies tailored to the information needs of college students enrolled in academic courses. It examines the possible applications of such a service, estimates costs per class and per user, and outlines the objectives, evaluation procedures, and costs of a two-stage feasibility study of the program. Results of discussions with instructors and students concerning the program and examples of on-line searches conducted for different courses are presented and discussed. (Author/CH)

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ON LINE BIBLIOGRAPHIC RETRIEVAL:
AN INSTRUCTIONAL RESOURCE FOR CLASSES

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March 22, 1976

2

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ABSTRACT

This paper proposes a rationale and a plan for using on line data base retrieval services to provide bibliographies tailored to the information needs of entire classes of students. It examines the possible applications of such a service, estimates costs per class and per user, and outlines the objectives, evaluation procedures, and costs of a two stage feasibility study of the program. Results of discussions with several instructors and students concerning the program are reported,. On line searches conducted for three different courses as examples of applications of the service are also discussed.

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EXPLANATORY NOTE ON ON-LINE BIBLIOGRAPHIC RETRIEVAL SYSTEMS

On-line computer-based retrieval of bibliographic information has been a major technological development of the 1960's and '70's. In recent years, academic libraries have begun to offer this service to their patrons by providing access to the retrieval systems operated by the National Library of Medicine, the System Development Corporation of Santa Monica, California, and the Lockheed Information Retrieval Service of Palo Alto, California. This report assumes some familiarity on the part of the reader with the on-line retrieval process and with such terms as bibliographic data base, computer connect time, etc. The following diagrammatic representation developed by the Lockheed Company is offered as a basic overview of the system. Lockheed and SDC together provide access to over 60 data bases in the sciences, social sciences and the humanities.

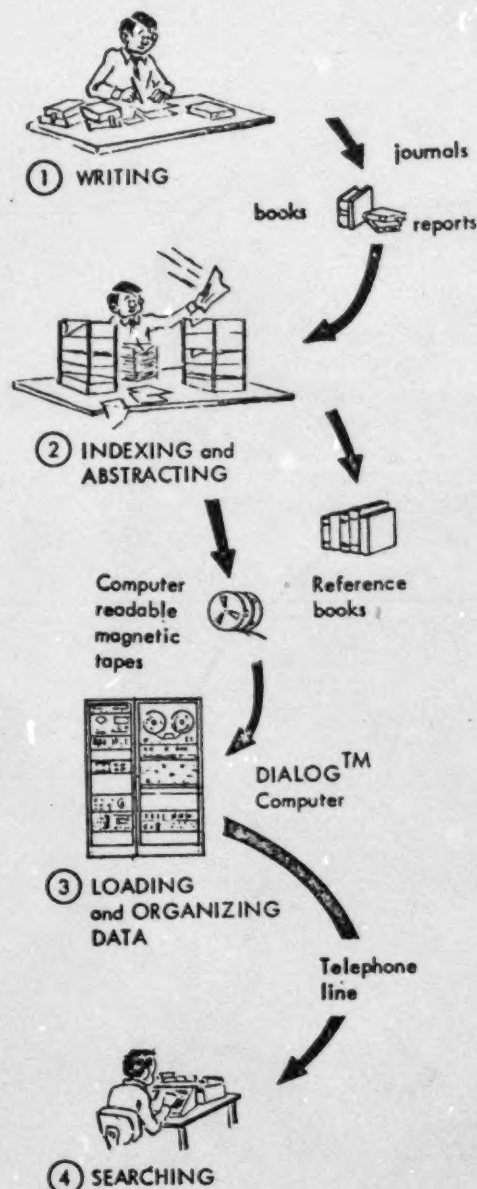
WHAT GOES INTO A DIALOG™ ONLINE BIBLIOGRAPHIC SEARCH??

1. WRITING: We are being flooded with a torrent of reports, books, magazines, journals, and newspapers, and need some way to find the information we want.

2. INDEXING AND ABSTRACTING: To help us, indexing services assign terms to each document to tell what the article is about, and abstracts of articles are also prepared. Various reference publishers provide this service, and the information is available in both book form and on computer-readable magnetic tape.

3. LOADING AND ORGANIZING: These magnetic tapes are mailed to the DIALOG™ computer center and are loaded into one of 30 different reference data bases, totaling more than 8 million citations. (A citation gives the title, author, publication, key words, and abstract.) In the loading process the data are specially organized so that the information can later be efficiently retrieved.

4. SEARCHING: The user accesses the DIALOG™ data bases using a typewriter-like terminal connected to the telephone lines. The terminal and the computer communicate by means of beeps that are translated into alphabetic and numeric characters. The user chooses search terms (that is, author name, subject, title words, etc.) that are appropriate to the patron's question. The DIALOG™ computer then searches the specially arranged files to rapidly locate citations that contain these search terms. The user can ask the computer to match and combine these sets of citations to obtain only those citations that satisfy certain combinations of search terms. (e.g., items on "solutions to the energy crisis involving solar power"). The user can request that the citations and abstracts be printed out at the terminal or printed "off-line" by the high-speed printer at the computer center. The results are then mailed to the user.



The relevance of the citations that you receive as a result of an online DIALOG™ search depends on the skills of the indexers who prepare the citations and the ability of the librarian searching the data base. The librarian must understand both the nature of the various data bases as well as the mechanics of the DIALOG™ commands. The cost effectiveness of the search also depends on the efficiency of the DIALOG™ system, and the computer equipment available to do the job.

TABLE OF CONTENTS

ABSTRACT

ACKNOWLEDGEMENTS

EXPLANATORY NOTE ON ON-LINE BIBLIOGRAPHIC RETRIEVAL SYSTEMS

TABLE OF CONTENTS

I. INTRODUCTION

OBJECTIVES.....	1
BACKGROUND.....	1
RELATED EFFORTS.....	2

II. THE RATIONALE FOR ON LINE BIBLIOGRAPHIC SERVICES FOR CLASSES

THE COMPLEXITIES OF INFORMATION RETRIEVAL.....	4
THE UN-GLORIES OF THE LITERATURE SEARCH.....	6
EQUALIZING ACCESS; EXPANDING ACCESS.....	7
DEVELOPING LIBRARY RESEARCH SKILLS.....	8

III. POTENTIAL USES AND POTENTIAL USERS

SOME POSSIBLE APPLICATIONS.....	9
EXAMPLE 1: BIBLIOGRAPHIES FOR PAPER TOPICS.....	9
EXAMPLE 2: SUPPLEMENT TO THE READING LIST.....	10
EXAMPLE 3: ADVANCED SEMINAR.....	11
THE INTERACTIVE EFFECT.....	12
DATA BASE CONTENT AND COURSE CONTENT.....	12
EFFECT ON THE INFORMATION GATHERING ABILITIES OF STUDENTS.....	13
GENERAL CONSIDERATIONS CONCERNING POTENTIAL USERS.....	14

IV. COST ESTIMATES

ESTABLISHING THE RANGES.....	16
CHARGES BY COMMERCIAL PROVIDERS.....	16
COSTS TO THE LIBRARY.....	17
PRODUCTION COSTS.....	20
CHARGES PER CLASS.....	21
COST ESTIMATING FORMULA.....	21

TABLE OF CONTENTS (cont'd)

COST ESTIMATE PER CLASS: EXAMPLE 1.....	22
COST ESTIMATE PER CLASS: EXAMPLE 2.....	23
OPTIONS IN THE SERVICE.....	24
PAYING FOR THE PROGRAM.....	24

V. A PROPOSED FEASIBILITY STUDY

CONSIDERATIONS.....	27
ADMINISTRATION AND CONTROL.....	28
PILOT PROJECT: STAGE 1.....	29
PILOT PROJECT: STAGE 2.....	33

VI. LIBRARIANS: THE UNTAPPED INSTRUCTIONAL RESOURCE.....35

REFERENCES

APPENDICES

I. INTRODUCTION

OBJECTIVES

The purpose of this report is to explore the feasibility of using on-line data base services to prepare bibliographies tailored to the instructional needs of individual classes. The basic concept of operation is that instructors and/or students would identify topics of interest for a particular class and that the library would use its on-line data base service to provide multiple copies of bibliographies that identify references pertinent to those topics. The goal of this paper is to consider some of the problems and potential uses of such an operation, to explore its probable costs per user, and to propose a two-stage pilot program designed to test its feasibility.

BACKGROUND

Within the past 2-3 years an increasing number of academic libraries have begun to offer on-line bibliographic data base services to their patrons. Because libraries are primarily oriented to serving the needs of their users on an individual basis (with the notable exception of the reserve book service), there has been an implicit assumption in the literature that these services would be used primarily by individuals, each with his or her own information requirement.

A major concern among librarians has been how the high cost of such services for individuals would be handled. Librarians have a strong tradition of, and intellectual

commitment to freedom of access to information. Freedom has implied "free" in the sense that no individual user is asked to pay for a specific library service. This tradition has been strongly buffeted in recent years, on the one hand by the growth of for-profit information service organizations, and on the other hand by the development of highly sophisticated and very costly information retrieval systems. While the goals of these new systems are well within the scope of traditional library activities, their costs - which on a per user basis can be as high as \$50-\$100 - are not. With great reluctance and in the face of declining financial resources available to them, libraries have been forced to institute fees for this kind of service. It is an acknowledgement of the economic facts of life that the decision for many libraries now centers not on whether to charge, but rather which costs should be carried by the patron and which should be carried by the library.

When the benefits and therefore the costs of on line searching can be distributed among several users, however, the per user cost can be reduced dramatically. An on-line search which has value for the members of an entire class has per user costs of an entirely different order of magnitude.

RELATED EFFORTS

A review of the literature (1) has failed to identify any reports of on-line data base services being provided

for entire classes of students. A personal tour during the summer of 1975 (2) of colleges and universities offering, or planning to offer on-line services also failed to locate any institution which was actively considering offering the service to classes.

There are a few examples of programs that have sought to extend the benefits of a search to more than one user. The National Library of Medicine, for instance, maintains a file of on-line searches already conducted. If a potential user finds that a search on his or her topic has already been performed, he or she can obtain a copy of the results without having to duplicate the expensive search process. The Council on Library Resources has sponsored research that has experimented with group current awareness searches conducted for individuals who have expressed an interest in the same general area of research. (3). No one has experimented with such a program, however, for people whose interests are mutually focussed to the degree that exists in a classroom.

We may conclude that the concept of on-line bibliographic services for classes of students has economic merit when considered on a cost per user basis. It also has potential merit as an innovative instructional resource. The questions that remain are whether this kind of service would be useful and effective and how it could be most efficiently operated. We turn first to a consideration of the rationale for the program.

II. THE RATIONALE FOR ON LINE BIBLIOGRAPHIC SERVICES FOR CLASSES

THE COMPLEXITIES OF INFORMATION RETRIEVAL

The growth of the world's literature - the so called information explosion - has probably had more serious consequences for the student struggling to gain competence in a field than for the scholar working of the forefront of his or her discipline. The scholar can rely on the informal, personal network of colleagues and conferences that are a significant resource for staying abreast of the newest developments in a field. The student, on the other hand, must rely primarily on the traditional library tools: the catalogs, the bibliographies, the indexing and abstracting publications. These secondary sources themselves have grown more numerous in recent years, partly in response to the growth of literature, partly in response to the increasing complexity of modern information needs. They have also become more sophisticated in terms of material and subjects covered and the types of access that they can provide. They have grown sufficiently complex that an increasing amount of time spent in the training and continuing education of librarians must be devoted to learning how to evaluate and use these new resources.

Every secondary publication will have its own access vocabulary and system of name control, its own policies regarding material scanned, subjects included, number and type of index terms assigned per item, etc. Each of these

characteristics will have an influence on the value of that particular source for a particular question. We must then multiply that complexity by the number of indexes and catalogs that may be appropriate for that question. Regardless of whether the information need is intra- or interdisciplinary, there can often be 5 to 10 bibliographic sources that could be profitably examined. A question related to federal policy on educational accountability, for example, could be usefully researched in PAIS, THE MONTHLY CATALOG, ERIC, CIS, SSCI, and the NEW YORK TIMES. A question involving drug therapy and schizophrenia could be researched in INDEX MEDICUS, EXCERPTA MEDICA, SCIENCE CITATION INDEX, BIOLOGICAL ABSTRACTS, CHEMICAL ABSTRACTS, PSYCHOLOGICAL ABSTRACTS, and PHARMACOLOGY ABSTRACTS.

Ironically, while the indexing tools have grown more sophisticated and reference librarians have improved their own knowledge and competence in information search and retrieval techniques, the users, particularly students, have probably lapsed further behind in their understanding of how to conduct an effective search for information. Rarely are undergraduates given any formal training in using library resources. What training they do get comes from the recommendations of busy reference librarians who seldom have time to explore the full range of options and techniques available to a student. The rest is all too often self-mis-education and the complacency that comes with not knowing.

THE UN-GLORIES OF THE LITERATURE SEARCH

Literature searching can be high adventure. Finding an article that supports one's own ideas - or contradicts them, learning of a promising new technique, delving into the origins of a problem can all generate intellectual excitement that should be part of every student's experience. Most of the time spent on literature searching, however, is anything but intellectually challenging. Rather it is routine and mechanical, far removed from the ultimate goal of engagement with the material. The amount of time that must be spent simply identifying and locating material is often far out of proportion to the time that remains for actually reading, analyzing, and evaluating it. Too frequently the result is that people may stop ~~one~~ before the search strategy has exhausted its effectiveness, or they may turn to less comprehensive sources, or they may grow inconsistent in their searching. In short, they do without information that could be very helpful to them.

There are, however, very important intellectual tasks required in a literature search, and it is these that should command the energy of the searcher: the determination of the range of information needed to satisfy the question, the formulation of the search strategy, the evaluation of initial results, the necessary revisions, etc. On-line computer ~~conducted~~ retrieval offers the possibility of allowing us to focus our attention on precisely these tasks and to leave the mechanical, time consuming tasks to the machine.

EQUALIZING ACCESS, EXPANDING ACCESS

Let us imagine the typical situation in which the instructor assigns a paper topic that requires his or her students to locate pertinent references, analyze the information in these references in the context of ideas developed in the course, and suggest some alternative approaches to the problem. There are actually two primary tasks involved in that assignment: locating the information and then analysis and synthesis. The students begin with varying library research skills, and depending upon their persistence, good fortune, and the number of others waiting at the reference desk for help, will emerge with great variation in the amount and value of material each is able to identify and locate. The quality of final reports will depend to an important degree on their effectiveness in locating information. Yet as we noted earlier, effective literature search and retrieval now demand experience and skills that few students have an opportunity to acquire.

The crucial point is that access to information in the learning environment of a university should not be a competitive task,^{or} allowed to be a hit or miss affair, subject to the widely varying experiences of users. Certain materials are placed on reserve for students so that all may have equal access to the information they contain. Beyond that elementary procedure, however, no system is provided to insure students have equal opportunity to read and evaluate the items that may be most valuable or relevant for a particular assignment.

What is being proposed here is a procedure to help equalize the opportunity for access to information so that students may get on with their primary learning tasks. On-line bibliographic services may offer one means of insuring that all students in the class have the same benefit of the skills of an experienced reference librarian using one of the most sophisticated of modern retrieval tools.

At the same time, though, such a program may allow an opportunity to expand access to information. As noted earlier, more than one bibliographic resource is usually pertinent to a given topic. If on-line services provide rapid access to the major files, students may have an opportunity to examine manually those sources they might not otherwise have reviewed.

DEVELOPING LIBRARY RESEARCH SKILLS

Providing bibliographic services to classes is not, however, a final solution to the more basic problem of helping students make more effective use of libraries. On-line services for classes have merit in their own right and ought to be complementary to programs designed to help students improve their own information gathering skills. This complementary relationship will be discussed in more detail in Section III.

III. POTENTIAL USES AND POTENTIAL USERS

SOME POSSIBLE APPLICATIONS

In preparing this report, the author spent some time discussing the possible uses of on-line services for classes with several instructors. Some sample machine-generated bibliographies were also prepared for their evaluation. The results of these discussions and sample runs for three different classes are reported in Appendix A. What follows here are some suggested uses of the program that emerged from those preliminary conversations and evaluations. More general consideration of uses and users will be taken up at the end of Section III.

EXAMPLE 1: BIBLIOGRAPHIES FOR PAPER TOPICS

Let us imagine a small upper division undergraduate class of 20-30 students in which the instructor assigns a paper on some aspect of the course. Shortly before that assignment is made, the instructor requests that the library prepare a bibliography on the subject, based upon the information he or she has provided on the scope of the topic, the type of material and dates of primary interest, and some known relevant citations. The library conducts a search of the 2 or 3 most pertinent data bases and screens the output for the obviously irrelevant material. The instructor then reviews the output, further eliminating items outside the scope of the topic and starring some of the more promising sources. The library then adds locations

and call numbers for those items it holds and produces the bibliography in multiple copies. The students use the abstracts, titles, and index terms to judge which references are of primary interest to them. They also have time to explore some of the printed indexes not covered by the on-line search.

If the search has identified a number of useful references, the search statements are stored in the computer and rerun for the instructor the next time he or she assigns that topic. This followup run is much cheaper than the original search, however, because the search strategy does not have to be rekeyed and only material added since the last run needs to be screened.

In addition, the instructor may wish to develop during the following year a bibliography for an alternative topic. Over 2-3 years several bibliographies can be produced for the course, and each can be very inexpensively updated for the current class.

EXAMPLE 2: SUPPLEMENT TO THE READING LIST

Consider a larger lower division course of 100 - 150 students. Because of class size, the instructor does not usually assign a paper. Required and recommended reading lists are provided and students are expected to integrate lectures and reading in answering examination questions. The course is in a rapidly evolving subject and is interdisciplinary in nature. The instructor is interested in providing students with a broader range of recent journal articles to supplement the recommended lists in some of the course's

key areas. Using the indicative words and phrases suggested by the instructor, the library searches abstracts, titles, and index terms in two on-line data bases. The results are screened by librarians and by the instructor and copies of the bibliography are provided for each student. Again, the search is saved and periodically updated. Over time, searches in several areas of interest are developed and are updated for each new class.

EXAMPLE 3: ADVANCED SEMINAR

Consider now an advanced seminar of 5-10 students. The students are expected to prepare and present a paper on some aspect of the topic being considered in the course. Even though they may each focus on different dimensions of the subject, these individual efforts will be related because they will all focus on one general topic. At some point in their research, usually after they have had an opportunity to examine some of the available material, the students would prepare a statement of their research interests. After meeting with the students as a group to discuss possible search strategies, the librarian would develop these statements into a combined search request and organize a print out that identified articles of general interest to the whole class, as well as articles that were of interest to each individual. The search would be run against 2-3 data bases judged likely to be most productive. Using this bibliography to identify a major portion of the

of the relevant literature, students could then pursue their topics in other secondary resources and also in references cited by the authors listed in the on-line produced bibliography.

THE INTERACTIVE EFFECT

The examples cited above are based upon comments by instructors and students about ways they now see to use on-line retrieval. There are potentially many other ways that on-line service could be employed for classes, once instructors and students become more familiar with its capabilities. For some classes, it might provide access to references and information on topics not previously included in the course because of the difficulty of obtaining worthwhile material; for other classes it might be a resource instructors could use to develop alternative teaching strategies. One of the objectives of the feasibility studies discussed later in this report is to establish some of the ways on-line retrieval could be employed as an instructional resource.

DATA BASE CONTENT AND COURSE CONTENT

One of the key issues that will have a strong effect on the usefulness of this service is the match between the subject matter covered by available data bases and the subject matter covered in courses. Given the range of courses available in a university and the range of data bases accessible on-line, it is impossible to predict that match. It can only be studied by an actual test of the program.

In this context, a key task of librarians is to understand the information needs of instructors and students and to be prepared to suggest the sources that might meet those needs. This is the traditional job of the reference librarian, and it can readily be extended to the teaching/learning environment of the classroom.

EFFECT ON THE INFORMATION GATHERING ABILITIES OF STUDENTS

As noted earlier, on-line services for classes should ideally be integrated with a general program whose goal is to help students improve their information gathering abilities. There are several ways in which the proposed on line service could assist in attaining such a goal.

For a bibliography prepared for a large class, for instance, a librarian could discuss with the class the way in which the search was prepared, how to interpret and use the results, the limitations of the search strategy and the data bases, ways to compensate for these limitations, other resources to examine, etc. This approach could provide some formal and very useful instruction in literature search techniques in a much more systematic way to a larger group of students than can be accommodated at one time at the reference desk. Also, it is extremely important for users to understand what an on-line search can and cannot do, and some type of explanation of these limits ought to be an integral part of the program.

For smaller, advanced seminar groups, the benefits can be even greater as students wrestle with the tasks of stating

their information need, formulating a search strategy, making an initial survey of the printed indexes, etc. The librarian could meet profitably with this group at least twice, once to discuss the development of a search request, and once to discuss the results of that search. The instruction in information collection could be at a more detailed and advanced level for this kind of student group.

GENERAL CONSIDERATIONS CONCERNING POTENTIAL USERS

It is useful at this point to recast the ideas of the preceding discussions into a more general mold. Figure 1 represents such an attempt by identifying some of the key factors that could influence the use of on-line services for classes. Whether an on-line data base search can be effectively utilized will depend on such factors as the style of the instructor for that particular course, the abilities of the students, the nature of the subject matter, and the course requirements. For each of these facets, there will be a set of alternatives, some of which will be far more conducive to the use of the service than others. In FIGURE 1, some of the more important of these alternatives are suggested and their influence is postulated. In effect, it is hypothesized that as one moves to either of the extremes for a given factor, the less useful on line services would be. For example, for the dimension NATURE OF COURSE SUBJECT MATTER, we can see that an introductory course in the calculus would fit the definition on the far left of that

FIGURE 1

MAJOR FACTORS LIKELY TO INFLUENCE USE OF ON-LINE SERVICES
(lines running thru an alternative suggest on-line retrieval may be appropriate for some courses meeting that description)

POTENTIAL FOR EFFECTIVE USE OF ON-LINE RETRIEVAL

FACTORS:

INSTRUCTOR'S
STYLE FOR
THAT CSE.

provides structured,
directed approach to
subject & material

diversified approach, open
to use of any pertinent
lit.

open approach but
strong emphasis on
student learning to
locate a few primary
documents

COURSE-
REQUIREMENTS

multiple choice
questions fr.
lectures &
assigned rdg.

essay exams
fr lectures
& optional
rdg.

short written
assignments
fr recommended
rdg.

individual
research on
assigned
topic

individual
research on
topic of own
choice

NATURE OF
COURSE
SUBJECT MATTER

basic course
with well
estab. content
in 1-2 texts

adv. cse. with
prime emph. on
anal. of limited
body of estab.
material

new approaches, theories
exp. results continually
evolving and reported
in lit. cse is in
traditional discipline

cross disciplines
drawing on work
in many areas

STUDENTS'
ABILITIES

need to develop
basic academic
skills in rdg,
anal., writing

have sat. competence
in basic acad. skills.
need experience with
diversity of info
resources

well developed acad.
skills. interests
lie in fields not well
covered by data bases.

dimension - "basic course with well established content represented in 1-2 texts" - and would likely fall outside the range of courses that could make effective use of on-line retrieval. Similarly, a course at the other end of the dimension, such as an "advanced topics in energy seminar" might be so diffuse and individualized that a common search strategy would have little value for all the class participants.

The purpose of FIGURE 1 is to suggest some of the most critical factors and hypothesize their effects. The positioning of the "effective use" boundary lines would have to be adjusted as a result of the initial feasibility studies. Even then, however, they would be nothing more than guidelines. The match between the bibliographic needs of any course and the available on line resources will always have to be assessed individually. The most that FIGURE 1 can do is suggest the most likely candidate courses.

IV. COST ESTIMATES

ESTABLISHING THE RANGES

The objective of this portion of the report is to identify the major cost elements in the service being proposed. Because there are so many variables and unknowns involved, the potential costs can only be estimated in terms of the likely ranges.

There are three major categories of costs: the charges of the commercial providers of on-line access (e.g. SDC and Lockheed, and the telecommunications companies); the costs to the library for professional librarians' time, and for equipment such as terminals; and the production costs for providing multiple copies of the bibliography. Each of these will be discussed in turn below. TABLE 1 summarizes these discussions by listing the range of cost estimates for each element in each category. Following the discussion of categories, we will consider two hypothetical examples of cost estimates for two different classes.

CHARGES BY COMMERCIAL PROVIDERS

1. Computer connect time.

Charges range from \$25/hr for some data bases to \$120/hr for others. On a per minute basis the range is .40 to \$2.00.

2. Telecommunications

The charge for phone connect time is \$8-10/hr, assuming one has access to a commercial low cost long distance phone service.

TABLE 1

ESTIMATE OF RANGE OF COSTS FOR ON LINE SERVICES FOR CLASSES*

	<u>RANGE</u>	
	<u>In dollars</u>	<u>In hours</u>
1. Charges by commercial providers		
a. computer connect time	.40-2.00/min.	
b. telecommunications	.13-.17/min	
c. citations printed offline	.05-.50/cite	
2. Costs of the library		
a. Professional Pers.		
1. presearch interview		.25-2.0 hr/search
2. search strategy development		.5-1.0 hr/search
3. search time on line		.16-.67 hr/search
4. post search screening		.5-1.0 hr/search
5. post search explanation		.5-1.0 hr/search
b. equipment & supplies	2,000 - 3,000# per year	
3. Production costs		
a. location & call numbers	5-10/search	
b. prep masters	4-18/search	
c. produce copies	1.25-2.50/search	

* See section IV of this report for discussion of assumptions used in calculation of these estimates.

This cost would be shared among all users of absorbed by the library - or some combination thereof.

3. Citations printed off line

The range is 5¢ to 50¢ per citation, again depending upon the data base searched.

COSTS TO THE LIBRARY

1. Professional personnel.

Because these costs and their manner of computation will vary from institution to institution, these estimates are computed in terms of time rather than money.

A. Pre-search interview.

Very little data based on long term operations is available yet for making this estimate. A recent study at Georgia Tech and UCLA (4) found that most times ranged between 15 and 45 minutes. For a program involving on line services for classes, it would be necessary to add to this figure:

1) Time spent to promote and explain the service to instructors during the first 1-2 years of its existence. Estimated at an additional .5 hours per class.

2) Time spent with advanced classes explaining the nature of literature searching, search formulation, etc. Estimated at .5-.75 hr/class.

The range of pre-search interview activities is therefore estimated at .25-2.0 hr/class.

B. Search strategy development

Again, very little long range operational experience is available. Estimates have ranged from 15-45 minutes. (5)

This is a cost that should decrease over time, as the searcher becomes more experienced. (6). For an instructor requiring a bibliography on a fairly clear cut topic, the search strategy phase should run 10-20 minutes. For advanced classes, however, in which each student has a different aspect of a general subject, the search strategy formulation could become complex and time consuming. Two factors should help eliminate some of the problems at this end of the scale. First, some advanced classes will play an active role in developing their own strategies. Second, if the information requests become too diffuse, a combined search could probably not be conducted anyway.

The most likely range for this category is estimated at 30-60 minutes.

C. On-line search time.

The average time required for on-line searching can vary greatly (5-20 minutes) (6) and at \$2.00/min this factor can greatly influence final costs. There are indications that time per search does decline as the searchers become more proficient. (6).

The estimated range used here will be 10 -40 minutes.

D. Post-search screening

One of the ways to reduce on-line costs is to screen the results of a search strategy off-line. It may be cheaper to think at 10¢/citation than at \$2.00/minute. In addition, the search analyst may wish to screen out citations that are obviously irrelevant in order to facilitate screening by the instructor.

This type of screening based upon the citation alone would probably require 30-60 minutes of a librarian's time, and 1-2 hours of the instructor's time.

E. Post-search explanation.

Finally, the librarian would want to spend some time with each class explaining the strengths and limits of the bibliography, other sources to examine, etc. This time is estimated at .5-1.0hr/class.

2. Equipment and supplies

Terminal rental and supporting documents such as thesauri and updated postings lists are additional costs that have to be borne in providing on-line service. These costs will vary and are not directly attributable on an individual search basis. The amount that each user would have to be charged to recover these costs would depend on the number of annual users. One alternative would be for the library to absorb these costs as part of its equipment and supplies overhead. Or users could be charged on the basis of the on-line time required to conduct their search. The issue involves a policy decision as well as a cost estimate. The range would be in the vicinity of of \$2000-3000/year for rental of terminal, paper supplies, phone installations, and supporting documents.

PRODUCTION COSTS

1. Adding locations and call numbers.

To increase the time and efficiency value of the of the bibliography for its users, the library could assign call numbers and locations to the items it holds. This operation could be performed fairly inexpensively relative to the total cost of a search and would assist all users as well as reduce the frustration of searching for a relevant document the library does not hold.

Using a consolidated listing of periodicals, journal titles could be located at the rate of at least one per minute. For bibliographies with books, an additional 5 minutes per title would be added in order to search the card catalog. The library could also append a list of reports (e.g. ERIC documents or NTIS documents) it regularly receives.

If we assume an average of 75-100 periodical titles and 3-5 books per off line print out, the look up rates suggested above would add 2-3 hours of clerical time per search. Assuming a rate of \$3-5/hr (direct labor and labor related benefits only) this would add \$5-10 to the cost of a search.

2. Preparation of the master

Once the relevant citations are selected and call numbers assigned, a page master can be arranged simply by cutting and pasting. If we assume 100 - 200 citations retrieved per search, 4 citations to a page, the resulting 25 - 50 pages would require (at 3 minutes per page) 1.25 - 3.5 hours

to prepare. Assuming a clerical rate of \$3-5/hour, we would add \$4-18 per search.

3. Production of multiple copies

Commercial rates can range from 5¢/page down to 2-3¢ depending upon volume. For 25 - 100 pages per search the cost per student copy would be \$1.25 - \$2.50.

CHARGES PER CLASS

The costs listed above for commercial charges, production costs, and time for the search strategy development, on line time and post search screening would all have to be multiplied by the number of data bases searched per class. It is assumed that the professional librarian's time for the pre-search interview and the post-search explanation would be within the ranges suggested regardless of the number of data bases searched. The average number of data bases appropriate for a given course topic can only be determined by a test run of the program. For some, one will be completely adequate; for others 4-5 might have to be considered.

COST ESTIMATING FORMULA

A formula for estimating costs per class is proposed in FIGURE 2. This formula is used for computing the sample class costs illustrated in TABLES 2 & 3. To provide some concrete examples for discussion, we shall now consider those two hypothetical cases.

FIGURE 1
FORMULA FOR ESTIMATING COSTS
PER CLASS

Cost per class=

$$\text{/*Commercial Charges*/} \left(\sum_{i=1}^n \text{DBS}_i = \text{ST}_i(\text{CCT}_i + \text{TC}_i) + \text{NCR}_i(\text{CPC}_i) \right)$$

$$\text{/*Production Costs*/} + \text{LCN}_i + \text{PM}_i + \text{CC}_i$$

$$\text{/*Professional Librarians Time*/} + \text{SSD}_i + \text{ST}_{ih} + \text{PSS}_i \Big) + \text{PSI} + \text{PSE}$$

$$\text{/*Equipment \& Supplies*/} + \text{Per user share of E\&S}$$

Where

n = number of data bases searched

DBS = data base searched

ST = search time on-line in minutes

CCT = computer connect time costs per data base per minute

TC = telecommunications costs per minute

NCR = number of citations retrieved

CPC = cost per citation printed

$$\text{LCN} = \left(\left(\text{NJG}_i \times \frac{1}{60} \right) + \left(\text{NBC}_i \times \frac{1}{12} \right) \right) \times \text{CWC}$$

Where

NJC = number of journals cited

NBC = number of books cited

CWC = clerical wage cost (direct labor and labor related benefits)

FIGURE 1 (cont'd)

$$PM = (NCP_i / CPP_i) \times TPM \times CWC$$

Where

NCP = number of citations printed in
bibliography

CPP = citations per page

TPM = time to cut and paste page master
per hour

$$CC = NC \times (NCP_i / CPP_i) \times CPCO$$

Where

NC = number of copies required

CPCO = cost per copy

SSD = search strategy development in hours

STh = search time on line in hours

PSS = post-search screening in hours

PSI = pre-search interview in hours

PSE = post-search explanation in hours

E&S = equipment and supplies

COST ESTIMATE PER CLASS: EXAMPLE 1

The program has been in operation for several years and promotional activity is no longer required. The search librarians have become very proficient in using the on-line systems.

An instructor requests a bibliography of recent (past 2 years) material dealing with the psychological effects of sensory deprivation with its possible effects on early childhood learning. The librarian conducts a 20 minute search on PSYCH ABSTRACTS and a 20 minute search on ERIC. 150 citations are printed off-line from each data base. To reduce costs, the ERIC citations are printed without abstracts; the large number of descriptors assigned in the ERIC data base to each document are judged sufficient for estimating the value of the article. A total of 200 are included in the final list for the bibliography and 100 copies are prepared for the students.

Using the assumptions listed in TABLE 2A, we can compute the estimated costs of the bibliography to be approximately \$330, plus 3.85 hours of professional librarian's time. The cost per student for the 100 members of the class can be estimated at between \$3 and \$3.50.

From the computations in TABLE 2B we can see that the major cost for this class is the duplication costs for 100 copies. Of the \$3 to \$3.50 per student, \$2.50 is required for producing each individual's copy. Doubling the on-line search time for both searches would add only 30¢ more per student to the overall costs. We have used a

TABLE 2A

VALUES ASSUMED FOR COMPUTING COSTS FOR EXAMPLE 1

COST ELEMENT (SEE FIGURE 2)	<u>DATA BASE</u>	
	<u>PSYCH ABS.</u>	<u>ERIC</u>
ST	20	20
CCT	.83	.42
TC	.17	.17
NCR	150	150
CPC	.10	.05
NJC	50	50
NBC	5	0
CWC	5.00	5.00
NCP	100	100
CPP	4	4
TPM	3/60	3/60
NC	100	100
CPCO	.05	.05
SSD	.5	.5
Sth	.3	.3
PSS	.5	.5
PSI	.5*	
PSE	.75*	

*One time cost assigned to first data base searched

TABLE 2B

COST ESTIMATE FOR A CLASS: EXAMPLE 1

(Estimate based on cost formula, FIGURE 2, and assumptions listed in TABLE 2A)

DATA BASE SEARCHED

	<u>PSYCH. ABSTRACTS</u>		<u>ERIC</u>	
	<u>dollars</u>	<u>hrs.</u>	<u>dollars</u>	<u>hrs.</u>
<u>Commercial charges</u>				
a. computer connect & commun.	20.00		11.40	
b. off line print	15.00		7.50	
<u>Production</u>				
a. location & call no.	6.25		4.20	
b. prep master	6.25		6.25	
c. copies	125.00		125.00	
<u>Library costs</u>				
a. pre-search interv.		.5*		*
b. search strat dev.		.5		.5
c. on-line time		.3		.3
d. screening		.5		.5
e. post-search explan.		.75*		*
	172.50	2.55	154.35	1.3

Total commercial charges and production costs = 326.85

Total professional librarian time = 3.85 hr

*One time cost assigned to first data base searched

very high cost for copying, however, and if special handling requirements can be minimized, it may be possible to reduce these costs to 2-3¢ per page for large classes. At that rate the per student cost would drop to \$1.00 - \$1.50. The feasibility study can shed some important light here.

COST ESTIMATE PER CLASS: EXAMPLE 2

A bibliography on communication among bees is prepared for an upper division class studying animal communication in general. The librarian conducts a search on BIOSIS, CAIN, and SCIENCE CITATION INDEX. The search time for the first two data bases is 30 minutes each because the librarian is relatively new to on-line searching and because the uncontrolled vocabulary of BIOSIS and CAIN make searching more difficult. The CITATION INDEX search takes 15 minutes. 100 citations from each data base are printed off line. 50 from each are then selected for inclusion in the bibliography. 20 copies are provided and the librarian spends 20 minutes with the class on the post search explanation. Estimated costs for the bibliography as computed in TABLES 3A-3B total approximately \$150 or \$7.50 per student, plus 4.5 hours of professional librarian's time.

In this instance the cost of copying the bibliography for each student is only \$1.50 per student. If the on-line search time could be cut in half by a more experienced searcher the costs per student would drop to \$5.50. Alternatively, if only BIOSIS were searched, the cost per student would drop to less than \$3.50 plus 2 hours of professional librarian's time.

TABLE 3A

VALUES ASSUMED FOR COMPUTING COSTS FOR EXAMPLE 2

COST ELEMENT (SEE FIGURE 2)	DATA BASE		
	<u>BIOSIS</u>	<u>CAIN</u>	<u>SCIENCE CITATION INDEX</u>
ST	30	30	15
CCT	1.10	.42	1.17
TC	.17	.17	.17
NCR	100	100	100
CPC	.10	.05	.10
NJC	50	50	50
NBC	0	0	0
CWC	5.00	5.00	5.00
NCP	50	50	50
CPP	4	4	10
TPM	3/60	3/60	3/60
NC	20	20	20
CPCO	.05	.05	.05
SSD	.3	.3	.3
STh	.5	.5	.25
PSS	.5	.5	.5
PSI	.5*		
PSE	.3*		

*One time cost applied to first data base searched

TABLE 3B

COST ESTIMATE FOR A CLASS: EXAMPLE 2

(Estimates based on cost formula, FIGURE 2, and assumptions listed in TABLE 3A)

<u>Commercial charges</u>	<u>BIOSIS</u>		<u>CAIN</u>		<u>SCIENCE CITA. INDEX</u>	
	<u>dollars</u>	<u>hrs.</u>	<u>dollars</u>	<u>hrs.</u>	<u>dollars</u>	<u>hrs</u>
a. computer connect & commun,	38.10		17.70		20.10	
b. off line print	10.00		5.00		10.00	
<u>Production</u>						
a. location & call no.	4.20		4.20		4.20	
b. prep master	3.25		3.25		1.25	
c. copies	13.00		13.00		5.00	
<u>Library costs</u>						
a. pre search interview		.5 *		*		*
b. search strat devel.		.3		.3		.3
c. on line time		.5		.5		.25
d. screening		.5		.5		.5
e. post search explan.		.3*				
	<u>68.55</u>	<u>2.1hr</u>	<u>43.15</u>	<u>1.3hr</u>	<u>40.55</u>	<u>1.05h</u>
Total commercial charges and production costs=					\$ 152.25	
Total professional librarian time				=	4.45hr	

*One time cost assigned to first data base searched

OPTIONS IN THE SERVICE

The two examples above suggest some of the procedural and cost options in conducting the service. There can be important variations in on-line search time, number of data bases scanned, number of citations printed out, number of copies produced, etc. If a primary goal is lower costs but broad coverage for a large class, for example, fewer copies for the bibliography might be produced and placed on reserve. Alternatively, during the post search explanation the librarian might suggest a detailed search strategy for a relevant data base that could not be scanned on line because of the costs involved. Once the service is in operation, there are many program options that could develop to meet the bibliographic needs of a specific group of students.

PAYING FOR THE PROGRAM

Even though the per user costs for this service are much lower than when ^{a search} conducted for a single individual, the total costs are still relatively high. There are four basic sources for funding such a service on an on going basis:

1. The University
2. The Library
3. The Academic Department
4. The Student Users

It is arguable that the university or the academic department should fund the service in the same way that classroom science laboratories or computer time for

instructional purposes are provided. The Library is a less likely source because the costs of the service on a university wide basis are far too high.

The student user could be asked to fund the service as the ultimate beneficiary, although the per user costs would undoubtedly have to be quite low before that option could be realistically considered. Whether it would be philosophically acceptable would depend upon the university's view of the student's obligation for the financial support of his own education. There are mixed precedents in this area, including the free-to-all reserve book service, the book store which stocks \$10-\$30 required texts, the lecture notes service which operates on a voluntary subscription basis at \$4-\$8 per user.

It is not the intent of this report to explore these options in greater detail, other than to suggest that the final solution could well be a combination of these sources based upon some rationale for identifying the obligation of each. Students, for example, might be asked to pay the cost of producing their own copies; the university and the department might carry the charges for computer connect time, off-line printing, and the librarian's instructional time spent with each class; the library might carry the remaining costs of the professional librarian's time. Whatever formula might evolve, it should be based upon an assessment of the instructional value of the service and its relationship to the educational goals of the university.

Obviously, it must also be based upon the potential funders' capacity to support it. The philosophical and pedagogical discussion must come first, however, because it must be established in advance whether the program should be regarded as a basic instructional resource of the university for equalizing and expanding access to information or as a convenient aid ^{to} students which should be funded solely by its ultimate users.

V. A PROPOSED FEASIBILITY STUDY

CONSIDERATIONS

Before the proposed service can be offered on a full scale basis to the university, it needs to be tested in a controlled pilot program. It was evident from discussions with a dozen faculty members at UCLA that the development of the service would require active promotion by the library. Because on-line services themselves are new to the librarian and users alike, the ways in which they can be used as an instructional resource for entire classes are not always evident. For many classes, of course, they will simply not be appropriate at all (see FIGURE 1). In addition, some faculty will not wish to use the service because they have found their current teaching methods and course organization satisfactory.

Faculty members who were more receptive to the service also had many questions, however. It is clear that librarian's will have to spend time in the initial stages of the program understanding the bibliographic needs of instructors and carefully explaining the strengths and limits of the service.

The major objective of Stage 1 of the pilot program, therefore, is to begin explaining and discussing the service with members of the faculty and developing some sample cases in which on line retrieval is successfully utilized. An additional objective is to carry out the entire service from pre-search interview to student evaluation of the product, in order to determine the most effective operating procedures.

Stage 2 of the pilot program should be designed to examine on a broader basis the potential usefulness of the service and its capacity to support a wide range of curriculum objectives.

ADMINISTRATION AND CONTROL

Although the program should initially be coordinated from a central post, especially to insure equity in resource allocation and systematic evaluation, the primary locus of control and energy should shift as rapidly as possible to the local units. The strength of a decentralized library lies in the capacity of the individual units to listen to, understand, and serve more effectively the needs of their particular patrons. It is at this operational level that the professional staff has the most opportunity to be aware of the interests of their users and tailor the services of the library to best serve those interests. This program will require a high energy commitment, especially at the beginning, because it requires active reaching out to potential users of the service. By keeping the number of classes small at the beginning and placing as much control as possible in the local units, however, there should be enough collective energy and sharing of ideas to develop a good service.

Because this will be the first contact for many users with on-line retrieval, it will be very important to take special care in producing the best possible bibliography and advising the users on what to expect and not expect.

PILOT PROJECT: STAGE 1

1. Objectives

- A. identify and seek remedies for problems encountered in providing the complete service to a class
- B. explain and demonstrate the service and obtain feedback on its potential usefulness to an instructor and to a class
- C. develop procedures and cost estimates for a program offered on a wider basis.
- D. obtain samples of good bibliographies for use in further demonstrations.

2. Sample classes and applications

Because a primary goal of stage 1 is to test the full service in operation, the range of disciplines served is somewhat less important than during stage 2. Any application for which on-line retrieval would be appropriate could be usefully tested, even if it involved only a small portion of the course content. If the application has potential as an example or a test case, it would be worth including in stage 1. In fact, instructors would probably be more likely to try the service for a small portion of the course rather than place major emphasis on an experimental program.

Demonstrations for the faculty would also be a valuable part of this stage if such sessions could generate feedback from the instructors on how the service could be employed in their classes.

3. Evaluation

At each stage of the process, data should be collected on the time spent, actual costs incurred, etc. This information could be conveniently collected by the use of a standard recording form prepared for each class. See suggested form,

APPENDIX B.

The evaluation of the usefulness of the bibliography would require comment from the instructor and the students. It would be important to have feedback from the students on how they used the bibliography, improvements they would suggest, and the amount they would consider reasonable if they were asked to share the cost. See the suggested questionnaire in APPENDIX C.

Feedback from the instructor should focus on his or her expectations of the service, whether these expectations were fulfilled, suggestions for improvements, other ways he or she might employ on line retrieval for the class, and whether the service were useful enough to seek ways to fund it on a regular basis. See the suggested questions, APPENDIX D.

It is recommended that feedback from students be collected by a questionnaire completed during class time. Feedback from instructors should be collected in interviews that focus on the questions in APPENDIX D. This will allow open ended discussions and follow up questions when appropriate.

In addition, the adequacy of the on-line bibliography should be evaluated in a general way from the point of view of the information specialist. The purpose of this evaluation would be to determine whether the most effective search strategy had been employed, whether the appropriate data bases had been scanned, whether a manual search would have been more effective, etc. This will require a general qualitative assessment by a senior reference librarian.

See APPENDIX E. While a complete so-called "failure analysis" is beyond the scope of this pilot project, it is important to have some evaluation of the product of on-line retrieval from an information specialists perspective.

4. Time schedule

It is important to have almost all participating faculty identified by the end of week two of a given quarter (at the latest) in order to allow time to integrate the bibliography in the curriculum.

The goal of a 1 week turnaround time from pre-search interview to delivery of bibliography should also be an objective so that the program can maintain flexibility and responsiveness. It would be self-defeating to have the speed of on-line retrieval lost in a two month turnaround.

Given the development and explanation goal of these stage, however, it would also be valuable to use some portion of the pilot project resources for demonstrations throughout the quarter. If turnaround can meet the standard outlined below, it would be possible to serve other faculty who learn of the program late in the quarter but who still wish to obtain a bibliography for their course.

Turnaround Goal

- Day 1: Instructor completes information request form; Pre-search interview; Search strategy developed; Search conducted.
- Day 4: Print out arrives; Librarian screens print out
- Day 5: Instructor screens print out
- Day 6: Add locations & call numbers; prepare masters
- Day 7: Produce copies and deliver

5. Costs

In computing the cost per class during stage 1, the following assumptions were made:

A. On-line search time would be high (average = 40 min.) because of the newness of on-line systems to the library.

B. An average of 2 data bases would be searched per class.

C. Searching would occur primarily in 12 data bases:

ASI	INSPEC
BIOSIS	NTIS
CAIN	PSYCH ABS
CHEMAB	SSCI
CIS	MEDLINE
ERIC	NYTDB

The estimated cost of computer connect time per minute is equal to the average connect time charges per minute for these 12 data bases.

D. 200 citations per data base searched would be printed.

E. The final bibliography would contain 300 citations or 75 pages.

F. An average of 20 copies of the bibliography per class would be required.

G. A professional librarian would be involved in the following tasks per class: (assumes 2 searches per class)

-Contacting prospective users	1.0 hr/class
-Pre search interview	.5 hr/class
-Search strategy development	1.5 hr/class
-Online search time	1.3 hr/class
-Post search screen	1.0 hr/class
-Post search explan. to class	.5 hr/class
-Evaluation	2.5 hr/class
	<u>8.3 hr/class</u>

From these assumptions, the following values were derived for insertion in the cost estimating formula (FIGURE 2):

N = 2	NBC = 10
ST = 40 min	CWC = \$5.00
CCT = .95	NCP = 150
TC = .17	CPP = 4
NCR = 200	TPM = 3/60
CPC = 10¢	NC = 20
NJC = 75	CPCO = 5¢

(Again, it must be emphasized that these figures are used solely for the purpose of arriving at some estimate of the cost of the service. Only the pilot programs will be able to determine what these numbers should actually be)

-The cost per class is therefore estimated at:

\$ 250 per class

Plus 8.3 hours of professional librarian's time

-For a projected stage 1 of 10 classes, the estimated cost of the project is:

\$ 2500

Plus 83 hours of professional librarian's time

PILOT PROJECT: STAGE 2

1. Objectives:

- A. conduct a more broadly based study of the value and application of the service
- B. test, evaluate procedures designed for a fully operational program
- C. develop final cost estimates
- D. identify sources for funding

2. Sample classes and applications.

Courses in the humanities, sciences, and social sciences should be involved, and classes of various sizes and orientation (introductory, advanced, etc,) should be represented. An estimate of the number of classes involved must await results from stage 1 which should provide some indication of the potential demand.

3. Evaluation.

While the evaluation forms from stage 1 can serve as a guide, new issues will undoubtedly emerge from that test, and will require other feedback questions and procedures.

4. Costs.

Costs for stage 2 should be projected from the results of stage 1.

VI. LIBRARIANS: THE UNTAPPED INSTRUCTIONAL RESOURCE

Regardless of the technology being employed, one of the most intriguing aspects of this proposal is its implication for the role of librarians in the educational process. By tailoring the resources of the library to the needs and goals of entire classes of students, the librarian can make a unique contribution to the learning process and the educational growth of many individuals. Librarians have the tools and knowledge to help make their vast storehouses more responsive and accessible to instructors and students. It is appropriate that these skills should become a more integral part of the classroom environment.

REFERENCES

1. See especially the ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY, volume 9, 1974 (chapter by Williams) and volume 10, 1975 (chapter 10).
2. Personal communication from Professor Pauline Atherton, Syracuse University
3. Meredith, Joseph C. SELECTIVE DISSEMINATION OF MICROFICHE DOCUMENTS IN A UNIVERSITY SETTING; PHASE 1. FINAL REPORT. Project CLR-561. Washington, D.C.: Council on Library Resources, 1975. (ED 112 954)
4. Carmen, James L. FINAL REPORT TO THE NATIONAL SCIENCE FOUNDATION ON GRANT GN-41236 TO MODEL THE USER INTERFACE FOR A MULTIDISCIPLINARY BIBLIOGRAPHIC INFORMATION NETWORK. Athens, Georgia: University of Georgia, May 1975.
5. Working Group on Costs and Charges for On-Line Services. REPORT. Los Angeles: UCLA Library, 1975. Staff paper.
6. Bourne, Charles; Robinson, Jo; Todd, Judy. ANALYSIS OF ERIC ON-LINE FILE SEARCHING. PROCEDURES AND GUIDELINES FOR SEARCHING. Berkeley: University of California, Institute of Library Research, November 1974. ILR 74-005

APPENDIX A

REPORT ON SAMPLE SEARCHES RUN FOR 3 INSTRUCTORS

As part of the background for this report, sample searches were conducted for three instructors who expressed an interest in the program. The goal of these searches was to demonstrate the process and the product of on-line retrieval and to use the sample runs and printouts as a basis for discussing possible applications of the service in these instructors' classes. Several search strategies and data bases were tested for each question and several sample printouts were produced off line for evaluation. For these sample runs there was no intention to produce an exhaustive search and there will not be a detailed report on the effectiveness of the particular search strategies or the data bases employed.

SAMPLE CLASS BIBLIOGRAPHY 1

Two instructors who teach a fairly large (100+ students)-introductory course for undergraduates were interested in the potential of the service for providing additional reading list material. Students take an essay exam at the end of the course and are expected to integrate readings and lecture material in answering questions. The existing reading lists are arranged topically.

A major problem in identifying reading matter for this course is that the existing printed indexes do not have a

retrieval vocabulary that adequately reflects the interests and intellectual focus of these instructors. On-line retrieval holds some promise in this respect because of its ability to conduct text searching of titles and abstracts for terms that the users judge to be relevant.

These instructors prepared an information request (see sample form, Appendix F) that was developed into several search strategies and run against SOCIAL SCIENCE CITATION INDEX, PSYCHOLOGICAL ABSTRACTS, AND ERIC. The results, judged on the basis of the sample printouts, were very promising and identified a number of useful references. The service was judged potentially very valuable and the instructors reported that they would use it to add new material to their course reading lists.

SAMPLE CLASS BIBLIOGRAPHY 2

An instructor for a small (20-30 students) upper division undergraduate course was interested in a class bibliography he could provide for students as an aid in preparing an assigned term paper. His usual procedure is to assign the topic, identify a few key references and have students locate any other pertinent material on their own.

From a written statement of the general paper topic, several search strategies were developed and run against PSYCHOLOGICAL ABSTRACTS, MEDLINE, CHEMCON, AND BIOSIS. The instructor found many of the retrieved citations to be highly relevant and useful for a student bibliography. He suggested some additional ways he might use the service for

developing reading lists and assignments in a much larger introductory course he also teaches; e.g., from a recommended list of references containing abstracts, students would select 2-3 citations and prepare a brief (1-2 page) critique of methodology, conclusions, or other common element.

SAMPLE CLASS BIBLIOGRAPHY 3

The instructor of a small (5 students) graduate seminar permitted his students to prepare an information request form for their own individual research papers. The main purpose of this search was to explore the feasibility of preparing a search strategy for a range of individual information needs linked by their involvement with a common topic. In this particular instance, the search strategy proved highly manageable and the search was conducted in less than 20 minutes.

The results were printed out in parts, the first part being literature review and summary type material. This was followed by the material of prime value to each class member listed separately. Students and the instructor were positive in their evaluation of the bibliography and felt it would well be worth a full trial.

APPENDIX B

GENERAL CLASS INFORMATION REPORT FORM
(suggested format)

Instructions: The project coordinator will insure that the required information for each class is obtained and entered on this form.

1. Instructor:
2. Course title and number:
3. Department:
4. Number of students enrolled:
5. Copy of course catalog description:
6. Teaching format (lectures, discussion groups, labs, etc):
7. Assignments and other requirements:
8. Attachments:
 - a. reading lists
 - b. assignments
 - c. tests
9. Purpose of bibliography

OPERATIONAL PROCEDURES RECORDING FORM

(suggested format)

TASK	COMPLETED BY	TIME SPENT	CHARGES INCURRED (if any)	PROBLEMS ENCOUNTERED	COMMENTS OR SUGGESTED SOLUTIONS

B - 2

Note: This recording form would be completed for each class bibliography prepared.
The form would be initiated with the pre search interview and be carried through the entire process.

APPENDIX C

C-1

EVALUATION OF ON-LINE GENERATED BIBLIOGRAPHY
TO BE COMPLETED BY STUDENTS

(suggested format)

1. Did this bibliography help you to locate information that was useful to you? If not, please indicate why.
2. How many items listed on this bibliography did you actually locate and read?
3. Did you also consult the printed copy of the data base that was searched by computer? If yes, did you locate useful information that was not in the computer generated bibliography? Please list those items.
4. Was it valuable to you to have your own copy?
5. Are there other improvements you would suggest in this service?
6. If students were required to purchase the bibliography rather than receive it for free, what would you judge to be a reasonable price?
7. Should this course continue to use this bibliography?
8. Are there other classes you have had that you think could have made use of such a bibliography?
9. Was the librarian's discussion of this bibliography and literature searching in general helpful to you? Please comment.

APPENDIX D

D-1

EVALUATION OF ON-LINE GENERATED BIBLIOGRAPHY
INTERVIEW QUESTIONS FOR INSTRUCTOR

(suggested format)

1. Did the bibliography meet your expectations? Please elaborate.
2. How would you rate the value of the bibliography for students?
3. Did the bibliography help you in any significant way in meeting your course objectives?
4. What suggestions would you make for improving this bibliographic service?
5. In what other ways could you see employing on line retrieval for courses?
6. Was the bibliography valuable enough for this class to ask the university and/or the department and/or students to pay the costs on a regular basis? If not for this class, do you think it would be so for another class?

APPENDIX E

1. Compare the statement of information need prepared by the user and the search strategy prepared by the librarian? Does the search strategy adequately reflect the information need? Would you suggest any improvements?

3. Examine the printed versions of the data bases searched. Were there citations present in the printed versions that were relevant to the information need but that were not retrieved by the on-line search? Comment.

APPENDIX F

DESCRIPTION OF TOPIC

Please describe in your own words and as precisely as possible the topic or topics in which you are interested. It is especially helpful to indicate any techniques, groups, time periods, geographic areas or other limiting factors that are of particular interest.

WORDS AND PHRASES

The retrieval system we are using match the words that describe your topic with the words that describe the references. The value of the search results are greatly affected by how adequately the words used in your request reflect your basic area of interest. Please list below any index terms, words, or phrases and their synonyms that you would use as criteria for selecting references if you were doing this search manually. Be sure to note if any of these words have special meanings in your search or have meanings that should be excluded.

WORDS/TERMS/PHRASES

SYNONYMS OR CLOSELY
RELATED TERMS

MEANINGS TO
BE EXCLUDED

SPECIAL FACTORS

1. Do you wish to receive references to documents written in:
_____ English _____ any language _____ other _____
(specify)
2. Please list any authors or organizations whose work is always
of interest to you in connection with this topic. (full name if known)
3. Please list the journals you think are most likely to contain
articles pertinent to your topic.
4. Which of the following types of references do you wish to receive?
(may not be possible to specify for all data bases)

patents _____	technical reports _____	biographies _____
dissertations _____	books _____	letters _____
conference _____	journal articles _____	editorials _____
proceedings _____	book reviews _____	review articles _____
5. Would it be more useful to you to have:

_____ A very broad search that would identify as many potentially
relevant articles, or other items as possible, even
though most would _____ probably not be pertinent to your
topic;

or

_____ A narrower search that would yield fewer references, most
of which would _____ probably be pertinent, even if some
other relevant items were missed.
6. Please list the publication years you would like to search, in
their order of value to you. (Earliest searchable year will
vary among data bases)

Most valuable _____ Least valuable _____
7. What is the maximum number of references you want to receive _____
8. If possible, would you like your output arranged in a particular
way, e.g. by author, by title, by date, by subject aspect, etc?

9. Please list one or two recent references in your area of interest that you have found useful. This helps us determine whether the search strategy is locating items known to be relevant to your topic.

10. If the work of a particular author is of special importance to your topic and you would like to find references which have cited that author's work, please list the author, the title of his work, the journal title if it appeared in a periodical, and the year of publication.